

Refine Search

Search Results -

Terms	Documents
L1 same memory same cache	97

Database:

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result set

DB=PGPB,USPT,USOC; PLUR=YES; OP=OR

<u>L2</u>	L1 same memory same cache	97	<u>L2</u>
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<u>L1</u>	((disk or disc) near5 controller) same switch	2129	<u>L1</u>
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END OF SEARCH HISTORY

Refine Search

Search Results -

Terms	Documents
(709/229 709/232 709/253 710/313 710/316 710/104 710/74 710/1 710/305 711/112 711/113 711/114 711/147 711/148 711/130 714/3 714/7).ccls.	12998

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result set

DB=PGPB,USPT,USOC; PLUR=YES; OP=OR

L1 710/313,316,104,74,1,305;711/112-114,147,148,130;714/3,7;709/229,232,253.ccls. 12998 L1

END OF SEARCH HISTORY

Refine Search

Search Results -

Terms	Documents
L2	0

Database:

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side by side		result set	
<i>DB=EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR</i>			
<u>L3</u>	L2	0	<u>L3</u>
<i>DB=PGPB,USPT,USOC; PLUR=YES; OP=OR</i>			
<u>L2</u>	L1 same memory same cache	97	<u>L2</u>
<u>L1</u>	((disk or disc) near5 controller) same switch	2129	<u>L1</u>

END OF SEARCH HISTORY

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Search Results -

Terms	Documents
L1 and L3	50

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US Pre-Grant Publication Full-Text Database

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L4

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side by side		result set	
<i>DB=PGPB,USPT,USOC; PLUR=YES; OP=OR</i>			
<u>L4</u>	11 and L3	50	<u>L4</u>
<u>L3</u>	L2 same memory same cache	97	<u>L3</u>
<u>L2</u>	((disk or disc) near5 controller) same switch	2129	<u>L2</u>
<u>L1</u>	710/313,316,104,74,1,305;711/112-114,147,148,130;714/3,7;709/229,232,253.ccls.	12998	<u>L1</u>

END OF SEARCH HISTORY

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Search Results -

Terms	Documents
L5 and (host or CPU).ab.	29

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 IBM Technical Disclosure Bulletins

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L7

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side by side

DB=USPT; PLUR=YES; OP=OR

L7 L5 and (host or CPU).ab.L6 L5 same (host or CPU)L5 L4 same interfac\$3L4 (disk adj1 controller) same switchL3 (5155835| 5206939| 5237573| 5499981| 5583876| 5819054| 5822779)! [pn]L2 (4476526| 5142627| 5335352| 6065096| 6094728)! [pn]L1 6385681.pn. or 6578108.pn.

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result set

29 L7146 L6242 L5526 L47 L35 L22 L1

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» Key

IEEE JNL IEEE Journal or Magazine

IEEE JNL IEEE Journal or Magazine

IEEE CNF IEEE Conference Proceeding

IEEE CNF IEEE Conference Proceeding

IEEE STD IEEE Standard

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Display Format: ☒ Citation ☐ Citation & Abstract

Select Article information

- ☐ 1. **An ASIC RISC-based I/O processor for computer applications**
 Cates, R.L.; Farrell, J.J., III;
 Euro ASIC '90
 29 May-1 June 1990 Page(s):50 - 55
[AbstractPlus](#) | Full Text: [PDE\(484 KB\)](#) IEEE CNF
- ☐ 2. **Synchronous servo-drive: a compact solution of control problems by means of a single-chip microcomputer**
 Naunin, D.; Reuss, H.-C.;
 Industry Applications, IEEE Transactions on
 Volume 26, Issue 3, May-June 1990 Page(s):408 - 414
[AbstractPlus](#) | Full Text: [PDE\(348 KB\)](#) IEEE JNL
- ☐ 3. **Disk system architectures for high performance computing**
 Katz, R.H.; Gibson, G.A.; Patterson, D.A.;
 Proceedings of the IEEE
 Volume 77, Issue 12, Dec. 1989 Page(s):1842 - 1858
[AbstractPlus](#) | Full Text: [PDE\(1644 KB\)](#) IEEE JNL
- ☐ 4. **Synchronous servodrive: a very compact solution of control problems by means of a single-chip-microcomputer**
 Naunin, D.; Reuss, H.-C.;
 Industry Applications Society Annual Meeting, 1988., Conference Record of the 1988 IEEE
 2-7 Oct. 1988 Page(s):266 - 271 vol.1
[AbstractPlus](#) | Full Text: [PDE\(404 KB\)](#) IEEE CNF
- ☐ 5. **90 mm rewritable optical disk drive**
 Nakane, K.; Ogawa, M.; Yoshimoto, K.; Ogura, M.; Kiyose, Y.; Furukawa, T.;
 Consumer Electronics, IEEE Transactions on
 Volume 38, Issue 3, Aug 1992 Page(s):648 - 653
[AbstractPlus](#) | Full Text: [PDE\(532 KB\)](#) IEEE JNL
- ☐ 6. **Single chip CD decoder**
 Finck, R.; Schutze, W.;
 Consumer Electronics, IEEE Transactions on
 Volume 36, Issue 2, May 1990 Page(s):89 - 91
[AbstractPlus](#) | Full Text: [PDE\(156 KB\)](#) IEEE JNL
- ☐ 7. **Output feedback sliding mode control for the flying height of a pickup head in near-field optical disk drives**
 Wu, W.C.; Liu, T.S.;
 Control Theory and Applications, IEE Proceedings-
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[AbstractPlus](#) | Full Text: [PDF\(316 KB\)](#) IEEE JNL



8. Setting up and using a multi-computer VXibus system

Wright, M.;
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[AbstractPlus](#) | Full Text: [PDF\(552 KB\)](#) IEEE CNF



9. Development of a software package for a flexible link manipulator

Kwok, N.M.; Lee, C.K.;
Advanced Motion Control, 2000. Proceedings. 6th International Workshop on
30 March-1 April 2000 Page(s):58 - 63

[AbstractPlus](#) | Full Text: [PDF\(580 KB\)](#) IEEE CNF



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Cristaldi, R.; Iannello, G.;
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Sanders, D.A.; Cremaldi, L.A.; Eschenburg, V.; Lawrence, C.N.; Riley, C.; Summers, D.J.; Petravick, D.L.;
Nuclear Science Symposium Conference Record, 2001 IEEE
Volume 1, 4-10 Nov. 2001 Page(s):515 - 518 vol.1

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12. SPEK: a storage performance evaluation kernel module for block level storage systems

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Modeling, Analysis and Simulation of Computer Telecommunications Systems, 2003. MASCOTS 2003. 11th IEEE/ACM
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12-15 Oct. 2003 Page(s):88 - 95

[AbstractPlus](#) | Full Text: [PDF\(318 KB\)](#) IEEE CNF



13. A man-machine interface software system for the design, modeling and simulation of robotic and automation systems

Patten, J.; Frazier, J.;
Robotics and Automation. Proceedings. 1987 IEEE International Conference on
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[AbstractPlus](#) | Full Text: [PDF\(512 KB\)](#) IEEE CNF

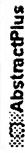


14. The design of an intelligent transparent speech interface

Tough, C.;
Systems and Applications of Man-Machine Interaction Using Speech I/O, IEE Colloquium on
18 Mar 1991 Page(s):2/1 - 2/4

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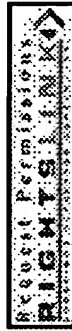
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Disk system architectures for high performance computing

Katz, R.H., Gibson, G.A., Patterson, D.A.
Dept. of Electr. Eng. & Comput. Sci., California Univ., Berkeley, CA, USA;

This paper appears in: **Proceedings of the IEEE**

Publication Date: Dec. 1989

Volume: 77, Issue: 12

On page(s): 1842 - 1858

ISSN: 0018-9219

CODEN: IEEPAD

INSPEC Accession Number: 3645522

DOI: 10.1109/5.48827

Posted online: 2002-08-06 16:47:12.0

Abstract

Following a brief review of the fundamentals of disk system architecture, the characteristics of the applications that demand high I/O system performance are described. Conventional ways to improve disk performance are discussed. New developments in disk array systems are introduced, and controller architectures are described

Index Terms

Inspec

Controlled Indexing

[computer interfaces](#) [controllers](#) [magnetic disc storage](#)

Non-controlled Indexing

[controller architectures](#) [disk array systems](#) [disk performance](#) [disk system architecture](#) [high I/O system performance](#) [high performance computing](#) [magnetic disc storage](#)

Author Keywords

Not Available

References

No references available on IEEE Xplore.

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- 1 Disk-based storage for scalable video, Ed Chang, Zakhor, A.
Circuits and Systems for Video Technology, IEEE Transactions on
On page(s): 758-770, Volume: 7, Issue: 5, Oct 1997

[Abstract](#) | [Full Text: PDE \(364\)](#)

- 2 Block-oriented compression techniques for large statistical databases, Wee-Keong Ng, Ravishankar, C.V.

Knowledge and Data Engineering, IEEE Transactions on

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[Abstract](#) | [Full Text: PDE \(408\)](#)

- 3 Adaptive prefetching and storage reorganization in a log-structured storage system, Chye Lin Chee, Hongjun Lu, Hong Tang,

Ramamoorthy, C.V.

Knowledge and Data Engineering, IEEE Transactions on

On page(s): 824-838, Volume: 10, Issue: 5, Sep/Oct 1998

[Abstract](#) | [Full Text: PDE \(600\)](#)

- 4 A performance evaluation of RAID architectures, Shenze Chen, Towsley, D.

Computers, IEEE Transactions on

On page(s): 1116-1130, Volume: 45, Issue: 10, Oct 1996

[Abstract](#) | [Full Text: PDE \(1360\)](#)

- 5 Design of fault-tolerant large-scale VOD servers: With emphasis on high-performance and low-cost, Golubchik, L.; Muntz, R.R.;

Cheng-Fu Chou; Berson, S.

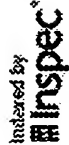
Parallel and Distributed Systems, IEEE Transactions on

On page(s): 363-386, Volume: 12, Issue: 4, Apr 2001

[Abstract](#) | [Full Text: PDE \(1720\)](#)

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L2: Entry 97 of 97

File: USPT

Oct 9, 1984

DOCUMENT-IDENTIFIER: US 4476526 A

**** See image for Certificate of Correction ****

TITLE: Cache buffered memory subsystem

Detailed Description Text (15):

As discussed above, in a preferred embodiment of the invention, it is configured as an add-on subsystem to a previously existing product, namely the model 8880 disk controller manufactured by the assignee of the present invention, Storage Technology Corporation. In this embodiment, the director 12 performs the functions of the director in the Model 8880; that is, it directs and interfaces to the control module which demultiplex the data to serial form thus directly interfacing the drives themselves, to the host channels thus converting the data from the form in which it is stored on disk to one to which the channel can respond. The director according to the invention performs the additional buffering functions of buffered data transfer, and execution of the stage and destage operations, i.e., writing of data from the disk via the control module into the cache buffer 30. The director also provides buffer error recovery systems, which amount to bypassing of the buffer in favor of direct transfer of data from the disk to channel interface, and the director communicates with the buffer manager. That is to say, the director performs switching functions, controlling the flow of data between the file interface to which is connected the control module and thence the disk units, the cache buffer 30, and the channel interface to which is connected the host computer. These switching functions are controlled in accordance with instructions received over a control interface 64 from the buffer manager 32. Thus, in the preferred embodiment in which the memory subsystem of the invention is added onto a preexisting STC 8880 product, the buffer manager control interface 64, the cache buffer 30, and the data interface 68 are added, while the director 12 is controlled to switch the data path in accordance with the instructions of the buffer manager 32.

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L2: Entry 97 of 97

File: USPT

Oct 9, 1984

US-PAT-NO: 4476526

DOCUMENT-IDENTIFIER: US 4476526 A

**** See image for Certificate of Correction ****

TITLE: Cache buffered memory subsystem

DATE-ISSUED: October 9, 1984

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Dodd; P. David	Boulder	CO		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Storage Technology Corporation	Louisville	CO			02

APPL-NO: 06/ 325346 [\[PALM\]](#)

DATE FILED: November 27, 1981

INT-CL: [03] G06F 13/00

US-CL-ISSUED: 364/200

US-CL-CURRENT: [711/113](#)

FIELD-OF-SEARCH: 364/2MSfile, 364/9MSfile

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	3566358	February 1971	Hasbrouck	364/200
<input type="checkbox"/>	3735360	May 1973	Anderson et al.	364/200
<input type="checkbox"/>	4075686	February 1978	Calle et al.	364/200
<input type="checkbox"/>	4096567	June 1978	Millard et al.	364/200
<input type="checkbox"/>	4161024	July 1979	Joyce et al.	364/200
<input type="checkbox"/>	4228496	October 1980	Katzman et al.	364/200
<input type="checkbox"/>	4228503	October 1980	Waite et al.	364/200
<input type="checkbox"/>	4271519	June 1981	Hall	371/38
<input type="checkbox"/>	4277844	July 1981	Hancock et al.	371/38

OTHER PUBLICATIONS

"Storage Attachment Architecture" by P. David Dodd; May, 1980; Storage Technology Corporation. IBM Corporation, "IBM 3880 Storage Control Model 11 and Model 13"; Oct. 21, 1981. IBM Tech. Discl. Bull., vol. 15, No. 11, Apr. 1973, pp. 3463-3464, "Attached Support Processor W/Shared Cache and Execution Unit" by Schmookler.

ART-UNIT: 236

PRIMARY-EXAMINER: Smith; Jerry

ASSISTANT-EXAMINER: Niessen; William G.

ATTY-AGENT-FIRM: Woodcock Washburn Kurtz Mackiewicz & Norris

ABSTRACT:

A buffered cache memory subsystem is disclosed which features a solid-state cache memory connected to a storage director which interfaces a host channel with a control module controlling operation of a long-term data storage device such as a disk drive. The solid-state cache memory is connected to plural directors which in turn may be connected to differing types of control modules, whereby the cache is usable with more than one type of long-term data storage means within a given system. The cache memory may be field-installed in a preexisting disk drive storage system and is software transparent to the host computer, while providing improvements in overall operating efficiency. In a preferred embodiment, data is only cached when it is expected to be the subject of a future host request.

14 Claims, 6 Drawing figures

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L2: Entry 69 of 97

File: USPT

Jun 22, 2004

US-PAT-NO: 6754769

DOCUMENT-IDENTIFIER: US 6754769 B2

TITLE: Disk array controller using crossbar switches and method of controlling the same

DATE-ISSUED: June 22, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Kawano; Masafumi	Tokyo			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
NEC Corporation	Tokyo			JP	03

APPL-NO: 09/ 976060 [\[PALM\]](#)

DATE FILED: October 15, 2001

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	2000-312846	October 13, 2000

INT-CL: [07] [G06](#) [F](#) [13/00](#)

US-CL-ISSUED: 711/114; 709/208, 709/209, 709/210, 709/211, 710/1, 710/317, 711/111, 711/112, 711/167

US-CL-CURRENT: [711/114](#); [709/208](#), [709/209](#), [709/210](#), [709/211](#), [710/1](#), [710/317](#), [711/111](#), [711/112](#), [711/167](#)

FIELD-OF-SEARCH: 710/1, 710/317, 379/291, 709/208-211, 711/111, 711/112, 711/114, 711/167

PRIOR-ART-DISCLOSED:

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5889969	March 1999	Getzlaff et al.	710/113
<input type="checkbox"/>	6094715	July 2000	Wilkinson et al.	712/20
<input type="checkbox"/>	6578126	June 2003	MacLellan et al.	711/167
<input type="checkbox"/>	6594739	July 2003	Walton et al.	711/155
<input type="checkbox"/>	6611879	August 2003	Dobecki	710/1

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
10-143465	May 1998	JP	
10-171746	June 1998	JP	
11-296473	October 1999	JP	
2000-99281	April 2000	JP	
2000-099281	April 2000	JP	
2002-533835	October 2002	JP	

OTHER PUBLICATIONS

Japanese Office Action dated Dec. 24, 2002, with partial English translation.
Japanese Office Action dated Apr. 8, 2003 with Partial English Translation.

ART-UNIT: 2187

PRIMARY-EXAMINER: Nguyen; T

ATTY-AGENT-FIRM: McGinn & Gibb, PLLC

ABSTRACT:

In a disk array controller, the cache memory has memory modules and a plurality of clossbar switches. A plurality of host computer adapters are connected with the clossbar switches while a plurality of disk enclosure adapters are connected with the clossbar switches. The clossbar switches are connected with the memory modules. The clossbar switches have function to directly connect the host computer adapters to the disk enclosure adapters. Accordingly, data transfer between the host computer and the disk enclosure can be carried out, independent on memory data transfer capability to the cache memory.

22 Claims, 10 Drawing figures

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L2: Entry 66 of 97

File: USPT

Feb 1, 2005

US-PAT-NO: 6848841

DOCUMENT-IDENTIFIER: US 6848841 B2

TITLE: Optical component connector

DATE-ISSUED: February 1, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Cochran; Robert A.	Roseville	CA		
Robinson; David A.	Loomis	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Hewlett-Packard Development Company, L.P.	Houston	TX			02

APPL-NO: 10/ 237475 [\[PALM\]](#)

DATE FILED: September 9, 2002

INT-CL: [07] [G02 B 6/28](#), [G02 B 6/42](#)

US-CL-ISSUED: 385/88; 385/24, 385/14

US-CL-CURRENT: [385/88](#); [385/14](#), [385/24](#)

FIELD-OF-SEARCH: 385/14, 385/24, 385/88-94, 385/129-132, 385/15, 385/16, 385/18, 385/31, 385/39, 385/42

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> 5488682	January 1996	Sauter et al.	
<input type="checkbox"/> 5726788	March 1998	Fee et al.	
<input type="checkbox"/> 5896473	April 1999	Kaspari	
<input type="checkbox"/> 5937133	August 1999	Moss et al.	
<input type="checkbox"/> 5980312	November 1999	Chapman et al.	
<input type="checkbox"/> 6172778	January 2001	Reinhorn et al.	
<input type="checkbox"/> 6233376	May 2001	Updegrove	
<input type="checkbox"/> 6290400	September 2001	Emberty et al.	
<input type="checkbox"/> 6318903	November 2001	Andrews et al.	
<input type="checkbox"/> 6379053	April 2002	van Doorn	

☐ . 6402393

June 2002

Grimes et al.

☐ 6661940

December 2003

Kim

385/15

ART-UNIT: 2874

PRIMARY-EXAMINER: Ullah; Akm Enayet

ASSISTANT-EXAMINER: Wood; Kevin S.

ABSTRACT:

A system and method for interconnecting electronic components for facilitating shared communication. The system comprises a translucent optical layer, a plurality of access slots in the translucent optical layer providing access thereto, and at least one electronic component having an optical communicator, and an optical interface connector. The optical interface connector is complementarily matched to at least one of the plurality of access slots. The optical communicator accesses the translucent optical layer when the at least one electronic component is inserted into at least one of the plurality of access slots.

22 Claims, 13 Drawing figures

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L2: Entry 56 of 97

File: PGPB

Jul 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020095551

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020095551 A1

TITLE: Disk array control device with two different internal connection systems

PUBLICATION-DATE: July 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fujimoto, Kazuhisa	Kodaira-shi		JP	
Tanaka, Atsushi	Urawa-shi		JP	
Fujibayashi, Akira	Kokubunji-shi		JP	
Kanai, Hiroki	Higashiyamato-shi		JP	
Minowa, Nobuyuki	Odawara-shi		JP	

APPL-NO: 10/ 100117 [PALM]

DATE FILED: March 19, 2002

RELATED-US-APPL-DATA:

Application 10/100117 is a continuation-of US application 09/358374, filed July 21, 1999, US Patent No. 6385681

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	DOC-ID	APPL-DATE
JP	10-264286	1998JP-10-264286	September 18, 1998

INT-CL: [07] G06 F 13/00

US-CL-PUBLISHED: 711/114; 710/74, 711/113

US-CL-CURRENT: 711/114; 710/74, 711/113

REPRESENTATIVE-FIGURES: 4

ABSTRACT:

A disk array control device which includes a plurality of channel interface (IF) units, a plurality of disk IF units, a cache memory unit, and a shared memory unit. The connection system between the plurality of channel IF units and plurality of disk IF units and the cache memory unit is different from the connection system between the plurality of channel IF units and plurality of disk IF units and the shared memory unit. In the invention the plurality of channel IF units and the plurality of disk IF units are connected via a selector to the cache memory unit whereas the plurality of channel IF units and the plurality of disk IF units are directly connected to the shared memory unit with no selectors.

[0001] The present application is a continuation of application Ser. No. 09/358,374, filed Jul. 21, 1999, the contents of which are incorporated herein by reference.

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L7: Entry 7 of 29

File: USPT

Dec 17, 2002

US-PAT-NO: 6496951

DOCUMENT-IDENTIFIER: US 6496951 B1

TITLE: Method for testing signal integrity in a data storage system

DATE-ISSUED: December 17, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Tuccio; William R.	Sutton	MA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
EMC Corporation	Hopkinton	MA			02

APPL-NO: 09/ 474633 [\[PALM\]](#)

DATE FILED: December 29, 1999

INT-CL: [07] [G11 C 29/00](#)

US-CL-ISSUED: 714/718; 365/201

US-CL-CURRENT: [714/718](#); [365/201](#)

FIELD-OF-SEARCH: 714/718, 365/201

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

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	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/>	5206939	April 1993	Yanai et al.	711/4
<input type="checkbox"/>	5574855	November 1996	Rosich et al.	714/41
<input type="checkbox"/>	5953352	September 1999	Meyer	714/820
<input type="checkbox"/>	6327676	December 2001	Abramov et al.	714/37

OTHER PUBLICATIONS

Co-Pending patent application S/N 09/474,886 Entitled "Method and Apparatus for Transmitting Fibre-Channel and Non-Fibre Channel Signals", filed Dec. 29, 1999 and Assigned to Art Unit 2874.

Co-Pending patent application S/N 09/473,668 Entitled "Fibre Channel Data Storage System", filed Dec. 29, 1999 and Assigned to Art Unit 2753.

Co-Pending patent application S/N 09/474,112 Entitled "Fibre Channel Data Storage System Fail-Over Mechanism", filed Dec. 29, 1999 and Assigned to Art Unit 2782.

Co-Pending patent application S/N 09/474,500 Entitled Fibre Channel Data Storage System Having

Improved Rear-End I/O Adapted HUB, filed Dec. 29, 1999 and Assigned to Art Unit 2753.
Co-Pending patent application S/N 09/474,384 Entitled "Fibre Channel Data Storage System Having Improved Front-End I/O Adapted HUB", filed Dec. 29, 1999 and Assigned to Art Unit 2753.

ART-UNIT: 2133

PRIMARY-EXAMINER: Decady; Albert

ASSISTANT-EXAMINER: Chase; Shelly A

ATTY-AGENT-FIRM: Daly, Crowley & Mofford, LLP

ABSTRACT:

A method for testing a data storage system, such system having a host computer coupled to a bank of disk drives through a system interface. The interface includes a plurality of directors and memories interconnected by a plurality of busses for controlling data transfer between the host computer and the bank of disk drives as such data passes through the memories. A portion of the directors is coupled to the host computer. The method includes providing a test printed circuit board having input ports adapted for plugging into a system printed circuit board, such test printed circuit board having a selector section adapted to couple any one of the inputs thereof to a test output on the test printed circuit board. The method includes the steps of: (a) prior to a test mode, removing a director or memory and replacing such removed director or memory with the test printed circuit board; (b) operating the system with the test printed circuit board; (c) selectively coupling the inputs of the test printed circuit board to the test output to examine a signal waveform produced at the test port; and (d) repeating steps (a-c).

3 Claims, 25 Drawing figures

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L7: Entry 7 of 29

File: USPT

Dec 17, 2002

DOCUMENT-IDENTIFIER: US 6496951 B1

TITLE: Method for testing signal integrity in a data storage system

Abstract Text (1):

A method for testing a data storage system, such system having a host computer coupled to a bank of disk drives through a system interface. The interface includes a plurality of directors and memories interconnected by a plurality of busses for controlling data transfer between the host computer and the bank of disk drives as such data passes through the memories. A portion of the directors is coupled to the host computer. The method includes providing a test printed circuit board having input ports adapted for plugging into a system printed circuit board, such test printed circuit board having a selector section adapted to couple any one of the inputs thereof to a test output on the test printed circuit board. The method includes the steps of: (a) prior to a test mode, removing a director or memory and replacing such removed director or memory with the test printed circuit board; (b) operating the system with the test printed circuit board; (c) selectively coupling the inputs of the test printed circuit board to the test output to examine a signal waveform produced at the test port; and (d) repeating steps (a-c).

Brief Summary Text (5):

As is also known, when using the fibre channel communication protocol, if any element in the channel becomes inoperative, the entire channel becomes inoperative. That is, if the first disk controller becomes inoperative, or if any one of the disk drives in the set coupled to the first channel becomes inoperative (i.e., as where the disk interface fails, the disk interface is inoperative, or removed with its coupled disk drive, or where the disk drive coupled thereto fails, or is removed), the first fibre channel, is "broken", or open, and becomes inoperative. The data stored in the entire portion of the set of disk drives coupled to the first disk channel is therefore unavailable until the inoperative first disk controller or inoperative disk drive is replaced. This is true with either the first channel or the second channel. One technique suggested to solve this problem is through the use of a switch, sometimes referred to as an LRC (i.e., a loop resiliency circuit) switch. Such LRC switch is used to remove an inoperative disk drive from its channel.

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L7: Entry 2 of 29

File: USPT

Nov 16, 2004

US-PAT-NO: 6820175

DOCUMENT-IDENTIFIER: US 6820175 B2

TITLE: Storage system, disk control cluster, and its increase method

DATE-ISSUED: November 16, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Fujimoto; Kazuhisa	Kokubunji			JP

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Hitachi, Ltd.	Tokyo			JP	03

APPL-NO: 10/ 222831 [\[PALM\]](#)

DATE FILED: August 19, 2002

PARENT-CASE:

CROSS-REFERENCE TO RELATED APPLICATIONS The present invention relates to U.S. patent application Ser. No. 10/067,332 entitled STORAGE SYSTEM DISK CONTROL CLUSTER filed by K. FUJIMOTO et al. on Feb. 7, 2002 and U.S. Patent Application Ser. No. 10/212,882 entitled DISK STORAGE SYSTEM HAVING DISK ARRAY CONNECTED TO DISK ADAPTER THROUGH SWITCHES to be filed by K. TANAKA et al. claiming priority under 35 USC 119 of Japanese Patent Application No. 2002-106262.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	P2002-077499	March 20, 2002

INT-CL: [07] [G06 F 12/00](#)

US-CL-ISSUED: 711/148; 711/112, 711/114, 711/147, 711/170, 711/202, 710/8, 710/14, 710/29, 710/38, 710/52, 710/305, 710/316, 710/317, 709/213, 709/214, 709/218, 709/229, 709/239, 709/249, 709/250, 707/10

US-CL-CURRENT: [711/148](#); [707/10](#), [709/213](#), [709/214](#), [709/218](#), [709/229](#), [709/239](#), [709/249](#), [709/250](#), [710/14](#), [710/29](#), [710/305](#), [710/316](#), [710/317](#), [710/38](#), [710/52](#), [710/8](#), [711/112](#), [711/114](#), [711/147](#), [711/170](#), [711/202](#)

FIELD-OF-SEARCH: 711/112, 711/114, 711/147, 711/148, 711/170, 711/202, 710/8, 710/14, 710/29, 710/38, 710/52, 710/305, 710/316, 710/317, 709/213, 709/214, 709/218, 709/229, 709/239, 709/249, 709/250, 707/10

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

[Search Selected](#)[Search ALL](#)[Clear](#)

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
<input type="checkbox"/> <u>5155845</u>	October 1992	Beal et al.	714/6
<input type="checkbox"/> <u>6216179</u>	April 2001	Murata et al.	710/8
<input type="checkbox"/> <u>6457098</u>	September 2002	DeKoning et al.	711/114
<input type="checkbox"/> <u>2002/0083299</u>	June 2002	Van Huben et al.	712/29
<input type="checkbox"/> <u>2002/0095549</u>	July 2002	Matsunami et al.	711/114
<input type="checkbox"/> <u>2003/0130833</u>	July 2003	Brownell et al.	703/23

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
2001-256003	March 2000	JP	

OTHER PUBLICATIONS

U.S. patent application No. 10/067,332 filed Feb. 7, 2002, Fujimoto et al, "Storage System, Disk Control Cluster and a Method of Increasing of Disk Control Cluster".

ART-UNIT: 2187

PRIMARY-EXAMINER: Sparks; Donald

ASSISTANT-EXAMINER: Truong; Bao Q

ATTY-AGENT-FIRM: Reed Smith LLP Fisher, Esq.; Stanley P. Marquez, Esq.; Juan Carlos A.

ABSTRACT:

The storage system includes disk control clusters. Each cluster has channel IF units, disk IF units and local shared memory units. The channel IF units, disk IF units and local shared memory units in the plurality of disk control clusters are connected to each other across the disk control clusters by interconnection, global information control unit for storing management information about the disk control clusters is connected to the interconnection. Host computers and the channel IF units of the disk control clusters are connected via front-end switch for storing copy of the management information. Since the front-end switch reflects the contents of the copy of the management information on routing table, an access request from the host computer can be sent to a suitable disk control cluster.

20 Claims, 24 Drawing figures

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Search Results - Record(s) 1 through 10 of 50 returned.

☐ 1. Document ID: US 20050097273 A1

Using default format because multiple data bases are involved.

L4: Entry 1 of 50

File: PGPB

May 5, 2005

PGPUB-DOCUMENT-NUMBER: 20050097273

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050097273 A1

TITLE: Storage device controlling device and control method for storage device controlling device

PUBLICATION-DATE: May 5, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kanai, Hiroki	Odawara		JP	

US-CL-CURRENT: 711/114; 711/147

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 2. Document ID: US 20050071552 A1

L4: Entry 2 of 50

File: PGPB

Mar 31, 2005

PGPUB-DOCUMENT-NUMBER: 20050071552

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050071552 A1

TITLE: Disk array control device with an internal connection system for efficient data transfer

PUBLICATION-DATE: March 31, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fujimoto, Kazuhisa	Kokubunji		JP	
Tanaka, Atsushi	Urawa		JP	
Fujibayashi, Akira	Kokubunji		JP	

US-CL-CURRENT: 711/113

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 3. Document ID: US 20050033914 A1

L4: Entry 3 of 50

File: PGPB

Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033914
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033914 A1

TITLE: Disk storage system

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Matsunami, Naoto	Sagamihara-shi		JP	
Oeda, Takashi	Sagamihara-shi		JP	
Yamamoto, Akira	Sagamihara-shi		JP	
Mimatsu, Yasuyuki	Fujisawa-shi		JP	
Sato, Masahiko	Odawara-shi		JP	

US-CL-CURRENT: 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 4. Document ID: US 20050033804 A1

L4: Entry 4 of 50

File: PGPB

Feb 10, 2005

PGPUB-DOCUMENT-NUMBER: 20050033804
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050033804 A1

TITLE: Storage system

PUBLICATION-DATE: February 10, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Iwami, Naoko	Sagamihara		JP	
Yamamoto, Yasutomo	Sagamihara		JP	
Fujimoto, Kazuhisa	Kokubunji		JP	

US-CL-CURRENT: 709/203; 711/113, 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 5. Document ID: US 20050027919 A1

L4: Entry 5 of 50

File: PGPB

Feb 3, 2005

PGPUB-DOCUMENT-NUMBER: 20050027919
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20050027919 A1

TITLE: Disk subsystem

PUBLICATION-DATE: February 3, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Aruga, Kazuhisa	Odawara-shi		JP	

US-CL-CURRENT: 710/316; 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 6. Document ID: US 20050005066 A1

L4: Entry 6 of 50

File: PGPB

Jan 6, 2005

PGPUB-DOCUMENT-NUMBER: 20050005066

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20050005066 A1

TITLE: Storage system and storage device system

PUBLICATION-DATE: January 6, 2005

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Nakayama, Shinichi	Chigasaki		JP	
Gotoh, Youichi	Odawara		JP	
Tamura, Keishi	Odawara		JP	

US-CL-CURRENT: 711/117; 711/114, 711/154

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 7. Document ID: US 20040236908 A1

L4: Entry 7 of 50

File: PGPB

Nov 25, 2004

PGPUB-DOCUMENT-NUMBER: 20040236908

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040236908 A1

TITLE: Disk array apparatus and method for controlling the same

PUBLICATION-DATE: November 25, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Suzuki, Katsuyoshi	Odawara		JP	
Hirasawa, Akihisa	Odawara		JP	

US-CL-CURRENT: 711/114; 711/113

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 8. Document ID: US 20040221102 A1

L4: Entry 8 of 50

File: PGPB

Nov 4, 2004

PGPUB-DOCUMENT-NUMBER: 20040221102

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040221102 A1

TITLE: Method and apparatus for initialization of storage systems

PUBLICATION-DATE: November 4, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Watanabe, Naoki	Sagamihara-shi		JP	

US-CL-CURRENT: 711/112; 711/170

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	IMC	Draw Desc	Image
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☐ 9. Document ID: US 20040215878 A1

L4: Entry 9 of 50

File: PGPB

Oct 28, 2004

PGPUB-DOCUMENT-NUMBER: 20040215878

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040215878 A1

TITLE: Method of controlling storage device controlling apparatus, and storage device controlling apparatus

PUBLICATION-DATE: October 28, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Takata, Yutaka	Kanagawa		JP	
Nakayama, Shinichi	Kanagawa		JP	
Ogasawara, Hiroshi	Kanagawa		JP	
Shikawa, Jinichi	Chiba		JP	
Saika, Nobuyuki	Kanagawa		JP	

US-CL-CURRENT: 711/114; 711/202

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	IMC	Draw Desc	Image
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☐ 10. Document ID: US 20040205294 A1

L4: Entry 10 of 50

File: PGPB

Oct 14, 2004

PGPUB-DOCUMENT-NUMBER: 20040205294

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040205294 A1

TITLE: Method of controlling storage device controlling apparatus, and storage device controlling apparatus

PUBLICATION-DATE: October 14, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Nakayama, Shinichi	Kanagawa		JP	
Ogasawara, Hiroshi	Kanagawa		JP	
Kobayashi, Naotaka	Kanagawa		JP	
Shikawa, Jinichi	Chiba		JP	
Saika, Nobuyuki	Kanagawa		JP	

US-CL-CURRENT: 711/114; 711/202

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Image
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Terms	Documents
L1 and L3	50

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☐ 11. Document ID: US 20040193799 A1

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L4: Entry 11 of 50

File: PGPB

Sep 30, 2004

PGPUB-DOCUMENT-NUMBER: 20040193799

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040193799 A1

TITLE: Disk array control device with an internal connection system for efficient data transfer

PUBLICATION-DATE: September 30, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fujimoto, Kazuhisa	Kokubunji		JP	
Tanaka, Atsushi	Urawa		JP	
Fujibayashi, Akira	Kokubunji		JP	

US-CL-CURRENT: 711/114; 711/113

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 12. Document ID: US 20040158673 A1

L4: Entry 12 of 50

File: PGPB

Aug 12, 2004

PGPUB-DOCUMENT-NUMBER: 20040158673

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040158673 A1

TITLE: Disk storage system including a switch

PUBLICATION-DATE: August 12, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Matsunami, Naoto	Sagamihara-shi		JP	
Oeda, Takashi	Sagamihara-shi		JP	
Yamamoto, Akira	Sagamihara-shi		JP	
Mimatsu, Yasuyuki	Fujisawa-shi		JP	
Sato, Masahiko	Odawara-shi		JP	

US-CL-CURRENT: 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 13. Document ID: US 20040128456 A1

L4: Entry 13 of 50

File: PGPB

Jul 1, 2004

PGPUB-DOCUMENT-NUMBER: 20040128456

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040128456 A1

TITLE: Storage system and data backup method for the same

PUBLICATION-DATE: July 1, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kobayashi, Naotaka	Odawara		JP	
Yokohata, Shizuo	Ninomiya		JP	

US-CL-CURRENT: 711/162; 711/112

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 14. Document ID: US 20040111560 A1

L4: Entry 14 of 50

File: PGPB

Jun 10, 2004

PGPUB-DOCUMENT-NUMBER: 20040111560

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040111560 A1

TITLE: Disk array controller

PUBLICATION-DATE: June 10, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Takase, Masayuki	Kokubunji		JP	
Fujimoto, Kazuhisa	Kokubunji		JP	

US-CL-CURRENT: 711/114; 711/113

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 15. Document ID: US 20040107325 A1

L4: Entry 15 of 50

File: PGPB

Jun 3, 2004

PGPUB-DOCUMENT-NUMBER: 20040107325

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040107325 A1

TITLE: Storage system, storage system control method, and storage medium having program recorded thereon

PUBLICATION-DATE: June 3, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Mori, Akihiro	Odawara		JP	

US-CL-CURRENT: 711/162; 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 16. Document ID: US 20040083338 A1

L4: Entry 16 of 50

File: PGPB

Apr 29, 2004

PGPUB-DOCUMENT-NUMBER: 20040083338

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040083338 A1

TITLE: Disk array controller

PUBLICATION-DATE: April 29, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Moriwaki, Norihiko	Hachioji		JP	
Fujimoto, Kazuhisa	Kokubunji		JP	

US-CL-CURRENT: 711/114; 711/112, 711/113

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 17. Document ID: US 20040064637 A1

L4: Entry 17 of 50

File: PGPB

Apr 1, 2004

PGPUB-DOCUMENT-NUMBER: 20040064637

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040064637 A1

TITLE: Broadcast system in disk array controller

PUBLICATION-DATE: April 1, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fujibayashi, Akira	Kokubunji		JP	
Tanaka, Atsushi	Urawa		JP	
Minowa, Nobuyuki	Odawara		JP	
Mikami, Hikari	Odawara		JP	
Nanao, Hisashi	Fujisawa		JP	

US-CL-CURRENT: 711/113; 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 18. Document ID: US 20040024951 A1

L4: Entry 18 of 50

File: PGPB

Feb 5, 2004

PGPUB-DOCUMENT-NUMBER: 20040024951

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040024951 A1

TITLE: Disk subsystem

PUBLICATION-DATE: February 5, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Aruga, Kazuhisa	Odawara-shi		JP	

US-CL-CURRENT: 710/316; 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 19. Document ID: US 20040010662 A1

L4: Entry 19 of 50

File: PGPB

Jan 15, 2004

PGPUB-DOCUMENT-NUMBER: 20040010662

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20040010662 A1

TITLE: Disk subsystem

PUBLICATION-DATE: January 15, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Aruga, Kazuhisa	Odawara-shi		JP	

US-CL-CURRENT: 711/114; 710/316

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw Desc	Image
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☐ 20. Document ID: US 20030200377 A1

L4: Entry 20 of 50

File: PGPB

Oct 23, 2003

PGPUB-DOCUMENT-NUMBER: 20030200377

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030200377 A1

TITLE: Disk array control device with two different internal connection systems

PUBLICATION-DATE: October 23, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fujimoto, Kazuhisa	Kodaira-shi		JP	
Tanaka, Atsushi	Urawa-shi		JP	
Fujibayashi, Akira	Kokubunji-shi		JP	
Kanai, Hiroki	Higashiyamato-shi		JP	
Minowa, Nobuyuki	Odawara-shi		JP	

US-CL-CURRENT: 710/316

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	INAC	Draw Desc	Image
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Search Results - Record(s) 21 through 30 of 50 returned.

☐ 21. Document ID: US 20030191892 A1

Using default format because multiple data bases are involved.

L4: Entry 21 of 50

File: PGPB

Oct 9, 2003

PGPUB-DOCUMENT-NUMBER: 20030191892

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030191892 A1

TITLE: Disk array control device with an internal connection system for efficient data transfer

PUBLICATION-DATE: October 9, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fujimoto, Kazuhisa	Kokubunji		JP	
Tanaka, Atsushi	Urawa		JP	
Fujibayashi, Akira	Kokubunji		JP	

US-CL-CURRENT: [711/114](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RWAC	Draw Desc	Image
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☐ 22. Document ID: US 20030191891 A1

L4: Entry 22 of 50

File: PGPB

Oct 9, 2003

PGPUB-DOCUMENT-NUMBER: 20030191891

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20030191891 A1

TITLE: Disk storage system having disk arrays connected with disk adaptors through switches

PUBLICATION-DATE: October 9, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Tanaka, Katsuya	Kokubunji		JP	
Fujimoto, Kazuhisa	Kokubunji		JP	

US-CL-CURRENT: [711/114](#); [711/154](#)

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	RWAC	Draw Desc	Image
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☐ 23. Document ID: US 20030191890 A1

L4: Entry 23 of 50

File: PGPB

Oct 9, 2003

PGPUB-DOCUMENT-NUMBER: 20030191890
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030191890 A1

TITLE: Disk subsystem and a method for controlling the disk subsystem

PUBLICATION-DATE: October 9, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Okamoto, Takeki	Odawara		JP	
Satoh, Takao	Odawara		JP	

US-CL-CURRENT: 711/112; 711/113

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Image
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☐ 24. Document ID: US 20030131192 A1

L4: Entry 24 of 50

File: PGPB

Jul 10, 2003

PGPUB-DOCUMENT-NUMBER: 20030131192
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030131192 A1

TITLE: Clustering disk controller, its disk control unit and load balancing method of the unit

PUBLICATION-DATE: July 10, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Nakamura, Shuji	Odawara		JP	
Fujimoto, Kazuhisa	Kokubunji		JP	
Kanai, Hiroki	Higashiyamato		JP	
Yoshida, Akira	Hatano		JP	

US-CL-CURRENT: 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Image
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☐ 25. Document ID: US 20030084237 A1

L4: Entry 25 of 50

File: PGPB

May 1, 2003

PGPUB-DOCUMENT-NUMBER: 20030084237
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030084237 A1

TITLE: Disk array controller

PUBLICATION-DATE: May 1, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Yoshida, Akira	Hadano		JP	
Nakamura, Shuji	Odawara		JP	

US-CL-CURRENT: 711/112; 711/113, 711/118

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Image
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☐ 26. Document ID: US 20020095551 A1

L4: Entry 26 of 50

File: PGPB

Jul 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020095551

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020095551 A1

TITLE: Disk array control device with two different internal connection systems

PUBLICATION-DATE: July 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fujimoto, Kazuhisa	Kodaira-shi		JP	
Tanaka, Atsushi	Urawa-shi		JP	
Fujibayashi, Akira	Kokubunji-shi		JP	
Kanai, Hiroki	Higashiyamato-shi		JP	
Minowa, Nobuyuki	Odawara-shi		JP	

US-CL-CURRENT: 711/114; 710/74, 711/113

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Draw Desc	Image
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☐ 27. Document ID: US 20020095549 A1

L4: Entry 27 of 50

File: PGPB

Jul 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020095549

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020095549 A1

TITLE: Disk storage system

PUBLICATION-DATE: July 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Matsunami, Naoto	Sagamihara-shi		JP	
Oeda, Takashi	Sagamihara-shi		JP	
Yamamoto, Akira	Sagamihara-shi		JP	
Mimatsu, Yasuyuki	Fujisawa-shi		JP	
Sato, Masahiko	Odawara-shi		JP	

US-CL-CURRENT: 711/114; 710/317, 710/74

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	NAME	Draw Desc	Image
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☐ 28. Document ID: US 20020091898 A1

L4: Entry 28 of 50

File: PGPB

Jul 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020091898

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020091898 A1

TITLE: Disk storage system

PUBLICATION-DATE: July 11, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Matsunami, Naoto	Sagamihara-shi		JP	
Oeda, Takashi	Sagamihara-shi		JP	
Yamamoto, Akira	Sagamihara-shi		JP	
Mimatsu, Yasuyuki	Fujisawa-shi		JP	
Sato, Masahiko	Odawara-shi		JP	

US-CL-CURRENT: 711/114; 710/316, 710/74, 711/170

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	NAME	Draw Desc	Image
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☐ 29. Document ID: US 20020046323 A1

L4: Entry 29 of 50

File: PGPB

Apr 18, 2002

PGPUB-DOCUMENT-NUMBER: 20020046323

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020046323 A1

TITLE: Disk array controller capable of transferring data at a high speed and method of controlling the same

PUBLICATION-DATE: April 18, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Kawano, Masafumi	Tokyo		JP	

US-CL-CURRENT: 711/114

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	NAME	Draw Desc	Image
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☐ 30. Document ID: US 6886086 B2

L4: Entry 30 of 50

File: USPT

Apr 26, 2005

US-PAT-NO.: 6886086
DOCUMENT-IDENTIFIER: US 6886086 B2

TITLE: Storage system and data backup method for the same

Full	Title	Citation	Front	Review	Classification	Date	Reference			Claims	KWIC	Draw Desc	Image
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(15) United States Patent
Beppu(16) Patent No.: US 6,256,762 B2
(45) Date of Patent: Jul. 3, 2001

(54) SEMICONDUCTOR DISK DEVICE

(58) Field of Search 714/763, 764,
714/767, 769; 355/189, 08

(75) Inventor: Atsushi Beppu, Tokyo (JP)

(73) Assignee: Old Electric Industry Co., Ltd., Tokyo
(JP)(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/153,497

(22) PCT Filed: Jan. 23, 1998

(86) PCT No.: PCT/JP98/00266

§ 371 Date: Sep. 23, 1998

§ 102(e) Date: Sep. 23, 1998

(87) PCT Pub. No.: WO98/33112

PCT Pub. Date: Jul. 30, 1998

(30) Foreign Application Priority Data

Jan. 23, 1997 (JP) 9-024437

(51) Int. Cl. G11C 23/00

(52) U.S. Cl. 714/763

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5,742,934	4/1998	Shimozono	711/103
5,754,567	3/1998	Norman	714/773

* cited by examiner

Primary Examiner—Albert Decady

Assistant Examiner—Shelly A. Chase

(74) Attorney, Agent, or Firm—Venable, Robert J. Frank,
Catherine M. Vothroes

(57) ABSTRACT

In a semiconductor disk unit, one sector data to be stored in a memory part is divided into a plurality of banks, and ECC data is prepared every bank so as to enhance the function of correcting errors even if there occur many error bits.

12 Claims, 9 Drawing Sheets

